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signing any reason, at the same time describing new species which should not be included in *Pseudomorpha.* The two genera, *Silphomorpha* and *Sphallomorpha*, can hardly be considered as distinct, the characters separating them being hardly of more value than as a means of defining generic groups. The whole subject has yet need of a revision, and it is to be hoped that those entomologists who have a full series of species accessible will determine their synonomy, and relieve them from the partial confusion in which they are at present found.

The habits of these insects are remarkable. Both our North American species live on flowers, and are very agile, while that from South America and those of Australia appear to live under bark.

For an opportunity of examining a small series of these insects, I am indebted to Dr. Leconte, to whom all the species in the Cambridge Museum were sent by Prof. Agassiz for study and identification.

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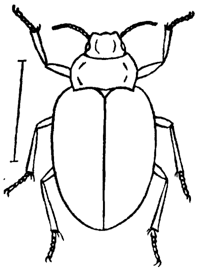
## On AMPHIZOA INSOLENS, Leconte.

BY GEO. H. HORN, M. D.

It is not expected that anything new will be written in the present paper, as the insect has been fully described by Dr. Leconte, (*Proc. Acad.* vi, p. 227,) and its systematic position ably discussed, while Dr. Schaum (*Insecten Deutschlands*) reviews the work and expresses a different opinion regarding its relationships. As it is very desirable to have all difficulties removed and differences of opinion adjusted, it has been thought advisable to present the subject anew to systematists, in order that the end may be reached. With this view, wood-cuts, carefully drawn, have been prepared, to illustrate the various external parts.

As the habits of this insect have been fully exposed (*Proc. Ent. Soc. Phil.,* Vol. vi, p. 289), it will be unnecessary to reiterate in the present paper, except to state that they live as do the Parnidæ, adhering to stones under running water. They are entirely sub-aquatic, and have never been found on land. It was my good fortune to capture a fine series of this insect while traveling in north-eastern California, among the streams tributary to Pit River, itself the larger fork of the Sacramento. Though still a rare insect in collections, it has been thought desirable and advantageous to science to dissect a few specimens so that better illustrations could be presented, and its external anatomy fully exposed. In the views of the under side the sutures have been more distinctly drawn than they can be seen in cabinet specimens. These sutures have been rendered thus distinct by macerating the insect in a solution of caustic potassa, a means so well known to Microscopists as to need no further comment.

a.

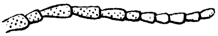


The accompanying outline view (*a*) will serve to give an idea of the general configuration of the insect. An excellent figure, illustrative of the sculpture, and from which the above outline was copied, may be found in Vol. ix, of the Pacific Rail Road Explorations and Surveys.

*Head* broad, wider behind the eyes, with a broad longitudinal impression each side, epistoma truncate.

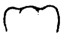
*Eyes* small, round and finely granulate.

b.



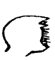
*Antennæ* (*b*) eleven-jointed, inserted under the margin of the front, rather above the base of mandibles, in a manner similar to *Loricera*, glabrous, sparsely punctured on the upper surface, the terminal three joints smooth, entirely destitute of sculpture.

c.



*Labrum* (*c*) transverse, faintly trilobed in front.

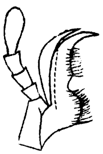
d.



*Mandibles* (*d*) short, obtuse, with a few small teeth and a slight brush of hair on the inner face.

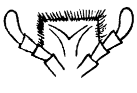
*Maxillæ* (*e*) entirely corneous, inner lobe with a slight emargination internally, and ciliate with spinose hairs in front of and behind the emargination. External lobe corneous not bi-articulate. This lobe appears *at all times* to be articulated beneath the inner lobe, so that from a view in front the insect appears to have double maxillæ.

e.



*Maxillary palpi* short, four-jointed, the first joint very small, the second and third longer and equal, the last joint equal to the two preceding together, and thicker.

f.

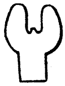


*Ligula* (*f*) quadrate, filling the emargination of the mentum, broader than long, ciliate on its margins, and without paraglossæ. Under surface with a Y-shaped elevated line.

*Labial palpi* short, three-jointed, supports prominent, first and second joints small, terminal equal to the two preceding. In the accompanying cut the palpi are pushed farther back than in nature, in order that the individual parts might be better represented.

*Mentum* (*g*) large, connate with the gula without trace of suture, entirely concealing the parts of the mouth above, deeply emarginate, with a broad tooth at the bottom of the emargination, lobes obtusely rounded. Lateral sutures of gula distinct.

*g.*



In his work on the genera of Coleoptera, Lacordaire commits the curious mistake of ascribing a totally different form to the ligula from that indicated by the above description; he says, "languette en forme de T." This mistake originated from a misinterpretation of the meaning of Dr. Leconte, (*Proc. Ac.* l. c.) in the first description of the insect, as follows:—"The ligula is large, filling the emargination of the chin, truncate at tip and prominent along the middle and apex, so as to present a form like the letter T." The inner lobes of the maxillæ are ciliate internally, and not as Lacordaire says, "lobe interne des machoires non cilié." The above-named author had, however, no opportunity of examining the insect, as no specimens had been sent abroad at the time the above extracts were written.

In the above descriptions of the head and parts of the mouth, hardly anything can be found in which this insect differs from the Carabidæ. The large size of the mentum is remarkable, also the absence of the gular suture, a character found only in a few Pseudomorphides and Siagonides,* the former being, however, insects of a very anomalous form, and whose claim to rank as members of the family Carabidæ has been doubted by various entomologists. In *Metrius* more particularly, and in other Carabidæ, the mentum is large, broad, and deeply emarginate, though never so entirely hiding all the parts above it, as in *Amphizoa*. The antennæ are also anomalous in being entirely glabrous, without pubescence, and only a few punctures on their upper surface.

*Prothorax* narrower than the elytra and in close contact with them, nearly twice as broad as long, narrower before than behind, sides ob-

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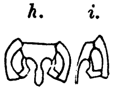
*The form of mentum among these insects is very similar to that seen in *Amphizoa*, particularly that of *Enceladus*, where the suture is entirely obliterated. In fact, its mentum might well represent an enlarged view of that of *Amphizoa*, excepting in the form of the tooth at the bottom of the excavation. Notwithstanding its large size in the Siagonides and Ditomides, the mentum never hides so completely the other parts of the mouth, as in *Amphizoa*. The mandibles are very prominent in the two tribes mentioned above, and in *Enceladus* recalling the form met with among the Scaritides, particularly *Pasimachus*.

tusely rounded. Anteriorly emarginate, posteriorly sinuate, with the angles distinct. Above with a longitudinal impressed line, with vague impressions laterally.

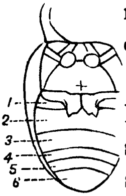
*Prosternum* (*h*, front view; *i*, side view) prolonged, behind the coxæ broader and flattened, received in an excavation of the mesosternum, meeting the prolongation of the metasternum between the middle coxæ.



*Coxal cavities* rounded, open behind closed in front by the sternum and epimera, completed behind by the sternum of the mesothorax.

*Mesosternum* short, separating the middle coxæ, concealed at its middle by the prolongation of the prosternum, side pieces diagonally divided, the epimera alone attaining the coxæ.

*Coxal cavities* rounded, closed in front by the sternum, laterally by the epimera of the mesothorax and the episternum of the metathorax, and behind by the metasternum.



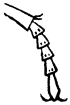
*Metasternum* broad, truncate posteriorly, side pieces simple, consisting of the episterna alone.

*Coxæ* broad, separated from the metathorax by a nearly straight suture, contiguous in the middle and attaining the margin of the body, cutting off all contact between the metathoracic parapleuræ and the abdomen.

*Abdomen* with six ventral segments, the anterior three connate. The first segment is entirely lateral and the second in contact with the coxæ at its middle. The second, third and sixth segments are much longer than the others.

*Elytra* oval, moderately convex, slightly flattened at the sides, humeri rounded. Epipleural fold broad anteriorly, suddenly narrowing opposite the hind coxæ and not reaching the apex of the elytron. Scutellum moderate, triangular. Under wings well developed, though probably never used, as the elytra are in close contact and, it is probable, totally inseparable by the action of the insect.

*Legs* slender, femora slightly thickened, tibiæ with two small terminal spurs. Front and middle tarsi with the first four joints small, subequal, the terminal joint longer. Posterior tarsi with the first and last joints longer, the intermediate short and equal. Claws small, simple. The joints of the tarsi are rounded beneath, and have (excepting the last joint) a small pubescent spot on each side.



The characters, as above given, drawn from the lower portion of the body, present but little of special importance, excepting the large size of the posterior coxæ, their contiguity on the median line, and the straight line separating them from the metasternum. It is curious that another error should have crept into the copied description of Lacordaire, as he states that these coxæ are not contiguous on the median line of the body.

There would seem to be but little doubt that this insect should occupy the systematic position assigned it by Dr. Leconte, although two eminent entomologists have, the one (Dr. Schaum) called it an aberrant Carabide, the other (Prof. Lacordaire) assigned it a position among the Dytiscidæ, in a subfamily of equal value to Haliplidæ and Pelobiidæ. Both opinions appear untenable by a review of the characters above given.

With the Dytiscidæ, *Amphizoa* has but little in common, excepting the large size of the posterior coxæ. The parts of the mouth, as stated by Schaum, have but little analogy to those of Dytiscidæ. The broad posterior coxæ separate it very easily from the Carabides, while at the same time, they are bounded anteriorly by a straight line, and cut off entirely the metasternum from the abdomen. It is not, however, on one character that the separation of *Amphizoa* from the two named families must depend. The whole conformation presents anomalies found singly in aberrant members of either family; but that the concentration of so many should occur in one insect is remarkable. Either this insect should link the two families into one, or it should form a family apart. The latter course would, therefore, seem the more rational.

Dr. Schaum has seen considerable resemblances to the Tenebrionidæ in its structure. There may be some resemblance in form (as to *Nyctopetus*) or even in its sculpture. *Metrius* has also been said to resemble some of the same family. It is difficult, however, to perceive any real structural similarities.

The antennæ do not resemble those of the Tenebrionidæ as Schaum insists. There is a total absence of pubescence, sensitive pores and spongy patches, such as are found on the terminal joints in that family. Here the case is reversed and the terminal joints are entirely smooth and glabrous. The similarity of the coxæ, particularly the posterior, to those of *Tentyria* is not very evident.

The sexual distinctions are not well marked, the female is broader and rather more robust.